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MEMOIR

Pg. 9-10

OF THE

MEDICINAL ACTION OF ARSENIC;

COLLECTED FROM THE

Reported Experience of the Members

OF THE

PROVINCIAL MEDICAL AND SURGICAL ASSOCIATION,



AND OTHER SOURCES.

BY THOMAS HUNT, M.R.C.S., &c.

*From the "Transactions of the Provincial Medical and Surgical Association," Vol. XVI., Part II.*

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MDCCCLXIX.



To my professional friends and brethren who have kindly assisted me in this inquiry, by forwarding reports of their experience, severally, in the medicinal use of arsenic, the following Memoir (reprinted, by permission, from the *Transactions of the Provincial Medical and Surgical Association*,) is respectfully and gratefully dedicated, by

Their obliged and humble Servant,

THE COMPILER.

26, Bedford Square, Bloomsbury,  
June, 1849.



## MEMOIR ON THE MEDICINAL ACTION OF ARSENIC.

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THE following Memoir may be regarded as the first fruits of a *plan for the advancement of medical science*, submitted to the Members of the South Eastern Branch of the "Provincial Medical and Surgical Association," at their annual meeting, held at Ashford, June 24, 1846. It consists chiefly of an arranged abstract of the replies of the Members of the Association, and other practitioners, to a series of questions addressed to the former through the medium of the *Provincial Medical and Surgical Journal*, and to the latter, by private communication. The number of replies received from the Members amounts to twenty-nine; the contributions received from other sources are forty-six in number, consisting chiefly of the replies of the author's own professional friends, to whom, as well as to the respondent Members of the Association, he takes this opportunity of returning his most cordial thanks. Some of these contributions are, as will be seen, extremely valuable; and it would be highly gratifying, if it would not appear invidious, to signalize the names of the authors whose letters are most highly esteemed. All that can be done, however, with propriety, by way of personal acknowledgment, is to subjoin a list of all the Members who have contributed, which list I am proud to exhibit, as containing many names dear to the cause of medical science. In addition to this, I may be allowed to express my especial obligations to Dr. James Heygate, then President of the Association, and to Dr. Charles Hastings, President of the Council, not only for their official sanction to the prosecution of the plan, but to their prompt replies to the questions. To the medical officers of the provincial hospitals, infirmaries, and dispensaries, who have related their experience, special thanks are likewise due, not only on account of the superior opportunities of observation

which their position affords them, but for the sacrifice of time, (the value of which their public engagements must enhance,) to the purposes of this inquiry. The kind assistance and encouragement afforded me by our late much lamented secretary and editor, Dr. Streeten, it would be ungrateful to pass over in silence. Nor can I forget the prompt and zealous aid of Mr. Martin, of Reigate, the much respected Secretary of the South Eastern Branch, who kindly forwarded my views, and commended the design to the notice of the Members of that division of the Association.

It will be a matter of surprise to some, and of regret to all, that the number of respondents bears so small a proportion to the whole number of Members. But it would be unjust to charge the non-respondents, or any one of them, with indifference to the progress of medical science. The more rational, as well as more liberal, construction to be put upon the silence of the majority, is that arsenic is so little used in the profession, that many practitioners have no return to make,—a conclusion which, by way of corollary, invests the inquiry with additional importance, inasmuch as it appears (as will be seen in the sequel) that arsenic does not really merit the neglect or reprobation of the profession. The delay which has occurred in the compilation will be readily excused by those of our brethren who are much engaged in practice, and it is even now prematurely published. It was my intention, as proposed in the first instance, to compare the results of this inquiry with existing authentic records, spread over the surface of periodicals and treatises. I found, however, that had my time and opportunity allowed me to attempt such an undertaking, the Essay would have been necessarily expanded to a bulk too voluminous for the publications of the Association. I shall, however, cherish a hope of accomplishing the task on a future day, and of laying the results before the profession in some form.

The following gentlemen have replied, more or less promptly, to the printed queries addressed to them; and to them the profession is indebted for whatever is practically valuable in this Memoir:—

RESPONDENT MEMBERS OF THE ASSOCIATION.

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Amyott, T. E., Esq., Surgeon, Diss, Norfolk.  
 Arrowsmith, J. Y., Esq., Surgeon, Shrewsbury.  
 Bainbridge, F., Esq., Surgeon, Harrowgate.  
 Barham, Charles, M.D., Truro.  
 Brown, T., Esq., Surgeon, Castle Donnington.  
 Cooper, Henry, M.D., Hull.  
 Cowan, Charles, M.D., Reading.  
 Crompton, Samuel, Esq., Surgeon, Manchester.  
 Dix, William, M.D., Long Buckby.  
 Evans, Evan, Esq., Surgeon, Leeds.  
 Forbes, John, M.D., F.R.S., &c., Old Burlington Street, London.  
 Fox, Joseph, Esq., Surgeon, Falmouth.  
 Graveley, Richard, Esq., Surgeon, Rigger, Lewes.  
 Hamilton, John, Esq., Surgeon, Elland.  
 Hastings, Charles, M.D., F.G.S., Worcester.  
 Heygate, James, M.D., F.R.S., Derby.  
 Jackson, Matthew, Esq., Surgeon, Market Weighton.  
 King, D. H., Esq., Surgeon, Stratton.  
 Mackness, James, M.D., Hastings.  
 Newnham, W., Esq., Surgeon, Farnham.  
 Payne, Henry, M.D., Nottingham.  
 Pope, Thomas, Esq., Surgeon, Cleobury Mortimer.  
 Probart, Frank George, M.D., Bury St. Edmunds.  
 Rudge, Henry, M.D., Leominster.  
 Salter, T., Esq., Surgeon, F.L.S., Poole.  
 Smith, T. H., Esq., Surgeon, Crowley.  
 Smith, T. H., Esq., Surgeon, St. Mary Cray.  
 Sweeting, W., Esq., Surgeon, Abbotsbury.  
 Webster, George, M.D., Dulwich.

RESPONDENT NON-MEMBERS.

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Ancell, Henry, Esq., Surgeon, Norfolk Crescent.  
 Andrews, Thomas, Esq., Surgeon, Canterbury.  
 Bateman, Henry, Esq., Surgeon, Islington Green.  
 Bennet, J. H., M.D., Cambridge Square.  
 Bird, Golding, M.D., Myddelton Square.  
 Brodie, Sir B. C., Savile Row.  
 Brown, I. B., Esq., Surgeon, Oxford Square.  
 Bull, Thomas, M.D., Finsbury Square.  
 Cassells, R., M.D., Manchester.  
 Collambell, Charles, Esq., Surgeon, Lambeth.  
 Cooper, T. S., Esq., Surgeon, Canterbury.  
 Crawford, Mervyn, M.D., Upper Berkeley Street.  
 Elliotson, John, M.D., Conduit Street.  
 Erichson, J. E., Esq., Surgeon, Welbeck Street.  
 Gasquet, R., Esq., Surgeon, Euston Place.  
 Girdwood, G. F., Esq., Surgeon, Southwick Crescent.



Greaves, George, Esq., Surgeon, Hulme, Manchester.  
 Green, Joseph Henry, Esq., Surgeon, Hadley.  
 Hunter, John, Esq., Surgeon, Great Tower Street.  
 Hurd, James, Esq., Surgeon, Frome.  
 Iliff, W. T., Esq., Surgeon, Newington.  
 Jones, F. C., M.D., Blackfriars Road.  
 Key, C. A., Esq., Surgeon, St. Helen's Place.  
 Linnecar, E. H., Esq., Surgeon, New Basinghall Street.  
 Lochee, A., M.D., Canterbury.  
 Lyon, E., M.D., Manchester.  
 Mc Whinnie, A. W., M.D., New Bridge Street, Blackfriars.  
 Major, D.B., Esq., Surgeon, Canterbury.  
 Mantell, Gideon, Esq., Surgeon, Chester Square.  
 Parrott, J., Esq., Surgeon, Clapham Common.  
 Paxton, James, M.D., Rugby.  
 Pilcher, George, Esq., Surgeon, Great George Street.  
 Randall, Alfred, Esq., Surgeon, Finsbury Square.  
 Ray, Charles, Esq., Surgeon, Gracechurch Street.  
 Roupell, G. L., M.D., Welbeck Street.  
 Saner, James, Esq., Surgeon, Finsbury Square.  
 Scudamore, Edward, M.D., Canterbury.  
 Spurgin, John, M.D., Guilford Street.  
 Thompson, A. T., M.D., Welbeck Street.  
 Thompson, Theophilus, M.D., Bedford Square.  
 Ure, Alexander, Esq., Surgeon, Bloomsbury Square.  
 Wakefield, H., Esq., Surgeon, Lansdowne Place.  
 Walshe, W. H., M.D., Queen Anne Street, Cavendish Square.  
 Waterworth, C., Esq., Surgeon, New Kent Road.  
 Wetherfield, J., Esq., Surgeon, Henrietta Street, Covent Garden.  
 Wilson, Erasmus, Esq., Surgeon, Upper Charles Street.\*

\* To the above list of correspondents I have the pleasure to add the name of James Startin, Esq., the surgeon to, and founder of, the London Cutaneous Institution, to whom I am indebted for replies to the queries, as well as an explanatory note. The substance of Mr. Startin's replies I have *not* embodied in the Report, for reasons which I trust will be satisfactory to the Members, as well as to himself. They are as follows:—1. Mr. Startin reports that he has had the opportunity of watching the internal administration of arsenic, “certainly in not less than *twenty thousand cases*.” 2. He states that he seldom or never gives the mineral *uncombined*. Now, as the aggregate number of cases reported by other gentlemen, (who *have*, for the most part, given it *uncombined*,) can scarcely be estimated at one-fourth of this number, it is evident, that by including Mr. Startin's cases, we should have so overwhelming a preponderance of cases in which the medicine was administered *in combination with other medicines*, as to deprive the Report of its real value as a statistical document. 3. Mr. Startin professes his intention to place many of his facts before the profession: it would, therefore, be scarcely fair to anticipate his intention, by giving an imperfect and hasty report. I may, however, be permitted to state, that his experience in the use of arsenic, as a therapeutic agent, coincides very generally with that of other correspondents, with one marked exception, viz.,—that he does *not* regard it “as the panacea for cutaneous diseases it is believed to be by some writers.” It will be observed, in the perusal of this memoir, that a large majority of the reporters are accustomed to regard arsenic, if not as a panacea, still as a very useful and efficient medicine in cutaneous diseases. Mr. Startin's experience most certainly entitles him to speak with confidence on this point; and it appears to be at variance with that of his professional brethren, who will look with anxiety for his report, which, it is to be hoped, will state fully all the circumstances which may in any way account for the discrepancy.



## ON THE MEDICINAL ACTION OF ARSENIC.

In endeavouring to analyse the mass of information placed in my hands by the kindness and zeal of my brethren, I find a large number of valuable *facts* more or less mixed up, in many instances, with *opinions*. Many of these opinions proceed from sources which entitle them to the highest respect of the profession, as opinions, and some of them it would be unpardonable to bury in oblivion; but my first duty is to separate them entirely from the facts on which they are founded. This having been done, the facts lie before me in such a variety of forms, and supported by such different degrees of demonstration, that it has been an undertaking of no little difficulty to arrange them with rigid fidelity and care. I propose first to take the questions as they were originally printed in the *Provincial Medical and Surgical Journal*, and present a faithful *abstract* of the answers; and afterwards to arrange and digest them in such a form, as may show the practical conclusions to which they lead.

## QUESTION I.

“In how many cases have you had an opportunity of watching the internal administration of arsenic in medicinal doses?”

To this question the replies are definite from some gentlemen, and indefinite from others. The definite replies present an aggregate of 1,651 cases. The indefinite consist of such expressions as “many,” “very many,” “a great many,” “a very great number,” “a great many for fifty years,” “frequently for thirty years,” “hundreds,” &c. &c. On the *lowest* calculation, allowing 200 for the term “hundreds,” and 20 for the term “many,” &c., this indefinite number must be set down as considerably upwards of 1,500, which, added to 1,651, makes upwards of 3,000 cases. Perhaps they might justly be put down at 5,000. But it will be quite safe to consider that the following memoir presents the results of 3,000 cases, in which arsenic has been used medically, by seventy-five different practitioners in various counties in England,

for the last half-century, about one-half of the number being metropolitan practitioners.

## QUESTION II.

“Did you ever see a case in which arsenic, so administered, (medicinally,) proved fatal?”

All the answers to this question are, without exception, “never;” and I am bound to add that the same reply is given by Mr. Startin, whose reported experience, for reasons already explained, is not embodied in this memoir.

## QUESTION III.

“Have you any proofs that, under your own observation, arsenic has ever, in medicinal doses, proved seriously or permanently detrimental to health? If so, state the symptoms, and mention the facts which prove that arsenic was the injurious agent.”

The answers to this question will be conveniently arranged in two classes. First, as to the question of *permanent* detriment to the health, every reply is in the *negative*. Secondly, as to the question of *serious* injury of temporary duration, the replies are all in the negative, with the following five exceptions; in one of which, carditis followed its use; in a second, mania; in a third, dysentery; in a fourth, vomiting, perspirations, bloody urine, and vesicles on the feet; and in a fifth, colic. In no one of these cases is there absolute proof that arsenic was the real cause of the affection, although in two of them (the second and fourth,) the extremely large doses which were administered render it highly probable. But, that the reader may judge for himself, I will subjoin the particulars of each case.

*Case 1.*—(Related by Mr. Jackson, of Market Weighton, Yorkshire.)—“A lady, aged forty, of sanguine temperament, had for some months been labouring under a cutaneous affection of the upper extremity—in appearance resembling urticaria. She took of Donovan’s Solution, five drops three times a day. On the fifth day carditis supervened. She did well, and the eruption was cured.”

to attribute the colic, in Dr. Thompson's case, to some other cause, because he very properly administered arsenic freely diluted, and on a full stomach; under which precautions, the stomach and bowels more rarely suffer from small doses.

The only conclusion which can be drawn from these cases is, that the administration of *excessive* doses of arsenic is liable to be attended with temporary inconvenience, the symptoms varying, both in kind and degree, with the mode of administration, and the constitution of the patient; but that these symptoms are neither dangerous nor liable to become permanent; for they uniformly subside upon the discontinuance of the medicine, which may afterwards be safely and beneficially resumed.\*

It seems necessary to add, that the case of local paralysis following the use of arsenic, read by Dr. Hastings, at the last Anniversary Meeting of the Association, and printed in the *Provincial Medical and Surgical Journal*, (August 23, 1848, p. 459,) had not occurred when Dr. Hastings kindly responded to my enquiries in January, so that it is not included in my list. I may also here refer the reader to a case related by Dr. Barham, which will be found in his reply to Question 14. It presents, at all events, a fact of interest, under which title Dr. Barham very properly classes it; but whether the symptoms are to be referred to the *post hoc*, or the *propter hoc* category, may be considered as still doubtful. The original disease was curious, and the case was treated with too much circumspection to present any strong points of practical instruction.

#### QUESTION IV.

"Did you ever see it (arsenic,) administered without producing any apparent effect on the system; and if so, in what doses, and how long was it persisted in?"

\* In a letter addressed by me to Mr. Martin, the Secretary of the South Eastern Branch, and read at the Annual Meeting, at Tonbridge Wells, June 28th, 1849, I stated, "that out of the records of a multitude of cases, in no one instance did it appear that the medicinal exhibition of arsenic, not always cautiously administered, has proved either fatal or seriously detrimental to the health." At the Annual Meeting, held at Bath in the August following, a Dr. Tunstall, (who has not yet favoured me with his valuable experience in arsenic,) is represented to have denied both the *facts* and the *deductions*, because he should otherwise be "accessory to the death of thousands!" I should be sorry to lead the Doctor into an error; but I cannot alter the facts, whether he "deny" them or not. The "deductions" are quite at Dr. Tunstall's disposal, even if he should be *accessory to their death*.

From *twenty* respondents an answer is returned in *the negative*. From *fifteen* the answer is *affirmative*; and *four* of these gentlemen report, that such a thing has happened “frequently;” *another*, “in seven cases;” *two others*, “in a plurality of cases;” *one*, “in two cases;” and *the rest*, “in one case.”

Ten drops of Fowler’s Solution is reported by one gentleman to have been administered thrice a day, for three or four weeks, without any sensible effect.

Another correspondent has given it “frequently” in large doses, and continued for a long time, without any sign of its presence.

Another; five minims for several weeks.

Another; four minims to twenty, for two or three months.

Another; six minims every six or eight hours, continued for three or four weeks.

Another; in lepra, for many months.

One gentleman continued it for four months, in seven cases, without effect.

One; ten minims, three times a day, for two or three months.

In none of these cases was there any sensible effect produced. It is very evident that before any positive conclusion can be drawn from these facts, (which must be somewhat startling to those readers who have used the medicine but sparingly,) the question presents itself, was the medicine pure and of proper strength? As this inquiry is comprehended in Question XI., it will be discussed in its proper place.

## QUESTION V.

“In what disease or diseases have you seen arsenic useful, and to what extent? What proofs can you give of its efficiency?”

Two or three gentlemen only, out of the whole number of respondents, report that they have frequently been disappointed in arsenic. One of them says that he has “employed it *very, very* little, chiefly in eruptive diseases, but without success;” that he has tried it in two cases of psoriasis for a great length of time, until both doctor and patient were tired, without effecting much good. Another correspondent says, “Generally speaking, it has failed under my administration of it, in several of the disorders where its efficiency has been most strongly declared.”



One of these gentlemen is the senior surgeon of a provincial hospital, and very largely engaged in private practice; the other is physician to one of the metropolitan hospitals, also in good practice; both men of observation and ample opportunities. They give no particulars of their cases, having no notes; nor can I in any way account for their disappointment in the use of a medicine in which almost every other correspondent, who has used it largely, speaks in the most confiding terms.

The diseases in which arsenic has proved eminently useful would appear, from the reports before us, far more numerous than either the compiler, or probably any one of the correspondents, would have imagined.

The following list specifies the diseases in which it has been used successfully. The numbers refer to the practitioners under whose observation it has been used in each disease:—thus, 63 report its use in cutaneous affections.\*

Cutaneous affections ... .. 63	Scrofula ... .. 1
Neuralgia ... .. 32	Remittents ... .. 1
Intermittents and malarious disorders 31	Chronic head-aches ... .. 1
Uterine affections, including uterine hæmorrhages ... .. 8	Cachexia ... .. 1
Chorea ... .. 6	Profluvia of mucous membranes ... 1
Chronic rheumatism ... .. 4	Epilepsy ... .. 1
Syphilis (secondary) ... .. 3	Cases requiring tonics ... .. 1
Carcinoma ... .. 3	Anæmia ... .. 1
Dyspepsia ... .. 2	Hysteria ... .. 1
Hypochondriasis ... .. 1	Ulcerations of the leg ... .. 1
Lumbago ... .. 1	Cephalalgia ... .. 1
	Hemicrania ... .. 1

To this table I have only to add, at present, that arsenic appears to have been more *uniformly* successful in *intermittents* than in any other diseases. Such is clearly the testimony of the contributors.

## QUESTION VI.

“Irrespective of its therapeutical efficacy, what effects have you observed to result from the medicinal use of arsenic? And

\* These are not reports of solitary cases, but of general professional experience in the different diseases enumerated. It is impossible to specify how many cases belong to each disease. The cutaneous affections mentioned consist of sixteen different varieties; but the majority are in favour of its special efficacy in *squamous* disorders.

what proof can you adduce that these effects were real, not imaginary?"

The latter part of this question has been so sparingly replied to, as to throw a shade of doubt over many of the responses to the first part. In other words, the effects attributed to the use of arsenic partake, in too many instances, more of the nature of opinions than of demonstrable facts. I shall adduce the facts which are supported by evidence, and reserve the opinions for future observations.

1. Mr. Bainbridge.—"Occasional head-ache and shivering."

*Proof*: "It subsided, on discontinuing the arsenic."

2. Dr. M. Crawford has graphically described the effects of arsenic as consisting in "Some indescribable disorder of the nervous system, restlessness, broken sleep, and vague internal feelings of alarm." *Proof*: "The patient not knowing he was taking arsenic."

3. Mr. Evan Evans.—"Some irritation of the stomach."

*Proof*: "Readily subsiding, on discontinuing the arsenic."

4. Mr. Iliff.—"Slight disturbance of the digestive organs."

*Proof*: "Patient not aware he was taking arsenic."

5. Mr. Linneear mentions "Itching of eyelids, nausea, and pain in the stomach and bowels." *Proof*: "Their cessation when the medicine was discontinued."

6. Mr. Smith, of Crawley, mentions "Muscular tremors."

*Proof*: "Twice produced, and subsiding on omitting the arsenic."

Besides these, *fourteen* respondents mention "affections of the conjunctiva and eyelids;" *nine* answer "none;" *six*, "nausea;" *five*, "heat, or constriction of the œsophagus;" *four*, "vomiting," "headache," "purging," and "gastrodynia;" and *one* or *two* only mention other symptoms not less than twenty-five in number, which (though there is no proof given that they really resulted from the medicine,) may be deemed worthy of being recorded. They are as follows:—Cutaneous eruptions, (herpetic, papular, vesicular,) itching of the skin, debility,\* pain in the bowels,

\* That some practitioners should mention "debility," and "diminished strength," and others "an invigorating effect," as *invariable* effects of arsenic, appears contradictory; but the truth is, its primary effect is almost always tonic and invigorating; its secondary effect, occasionally depressing.



swinnings, giddiness, shivering, ptyalism, increased appetite, œdema, anorexia, thirst, feverishness, white tongue, heat of abdomen, tonic effect, alterative effect, swelling of the limbs, swelling of the knees. Both of the two latter symptoms are described as resulting from "too large doses."

#### QUESTION VII.

"Is there any one symptom (or more,) which you have found invariably resulting from the exhibition of arsenic; and what symptom or symptoms?"

To this question, *twenty-three* replies are in the "negative;" *seven*, "conjunctivitis," or "tumid eyelids;" *two*, "nausea," or sickness;" and the following symptoms are severally mentioned, each by *one* respondent only, viz: "burning pain in the stomach," "an invigorating effect," "heat and constriction of the œsophagus," "emaciation," "diminished strength, *if long continued*," "gastro-dynia," "universal warmth," "swelling of the face," "pityriasis," "swelling of the limbs, if pushed too far," "slight purgative effect."

#### QUESTION VIII.

"Have you noticed much variableness in its action in different cases, or the contrary? Have you observed its effects modified by age, sex, or idiosyncrasy; and to what extent?"

*Nine* respondents reply in the affirmative, and *seventeen* in the negative; and *one* observes that females seem more susceptible of its irritating tendency than males.

#### QUESTION IX.

"State generally the conditions which have guided you in the administration of arsenic; what you have observed as the signs of an overdose; and what the circumstances which, in your experience, have seemed to contra-indicate its use?"

This question, it will be observed, has relation, not to any absolute facts regarding the operation of arsenic, but it was intended to elicit a general record of the *opinions* held by the

profession, and the general *practice* founded upon these opinions. The answers are therefore to be considered, not as scientific, but as historic facts. They present a record, as far as it can be obtained, of the opinions of the British members of the profession, on the medicinal action of arsenic on the human system, in the middle of the nineteenth century. The history is, of course, very incomplete, but it is faithful and true as far as it goes, and may be read with interest as well in future ages as at the present time. The replies are extremely various, but not so contradictory as to show a very important discrepancy of opinion. Indeed the variations of opinion may be fully explained by the variableness of effects observable by individuals in the action of the medicine, as well as by the distinction between its *primary* and *secondary* action.

1. The conditions which have guided the several respondents; or, in other words, what they have conceived to be the indications for its exhibition, are comprised in the following terms, viz :—

The phlegmatic rather than the sanguine temperament.  
 Cachectic lax-fibred habits.  
 When other medicines fail.  
 In periodic diseases.  
 Debility.  
 Atonic state of the system.  
 Good general health.  
 Obstinacy of the disease.

The presence of lepra.  
 The chronic character of the disease.  
 General pallor.  
 Slow circulation.  
 General coldness.  
 Non-inflammatory condition.  
 Freedom from febrile or mucous irritation.

2. The following are mentioned by the various contributors as the signs of an over-dose, viz :—

Irritation of the mucous membranes.  
 Headache, with flushings.  
 Sickness and pain in the stomach.  
 Sickness or purging.  
 Gastric symptoms.  
 Unusual violence of the usual signs.  
 Restless nights.  
 Desquamation of the cuticle.  
 Swelling of the features.  
 General inflammatory state.

Tympanitis.  
 None.  
 Conjunctivitis.  
 Intermittent pulse.  
 Nausea.  
 Pain in the stomach.  
 Exhaustion.  
 Sinking.  
 Palpitations.  
 Giddiness.

3. The following circumstances have been considered, by the several respondents, as contra-indicating the use of arsenic, viz :—

Unsound lungs.  
 Natural irritability of mucous membranes.  
 Plethoric and inflammatory states.  
 Tonic condition of the system.  
 Sanguineous temperament.  
 Inflammatory tendency.  
 Tendency to sudden nervous exhaustion,  
 from any cause.

Irritability of constitution.  
 Acute diseases.  
 Proneness to irritability of the cir-  
 culative or assimilative system.  
 Eczema mercuriale.  
 Head symptoms.  
 Organic disease.

### QUESTION X.

"State particularly what preparations you have used; what doses; whether administered on a full stomach or fasting; whether in increasing, decreasing, or uniform doses; whether alone or in combination; whether in hospital or private practice?"

The replies to these particulars tend to throw some light over the general results, and we have especially to thank the correspondents for the minuteness of many of their responses on these points.

1. The preparation generally used appears to have been the liquor potassæ arsenitis of the Pharmacopœia. About *fifty* gentlemen specify this; *four* mention the arsenious acid; *four*, Donovan's Solution; *one*, the arsenite of ammonia; and *one*, the iodide, ioduret, and deuto-ioduret of arsenic. Five-sixths, therefore, appear to have used Fowler's Solution exclusively.

2. This preparation has been used in a great variety of doses, varying from one minim to twenty, three times a day, or oftener. The following particulars are arranged from the practice of the different respondents:—

Min. x. to xx. ter in die.	Min. iij. ad. xv.
— x. to xv. ter in die.	— iij. ad. viij. sexta quaque hora.
— x.	— iij. ad. x.
— vi.	— iij. ad. iv. ter in die.
— v. to x. quarta quaque hora.	— iij. ad. v.
— v. ter in die.	— iij. ad. xv.
— iv. ad. xii. ter in die.	— ij. ad. vi.
— v. ad. xx. "in intermittents."	— ij. ter in die.
— v. ad. x. ter in die.	— i. ad. v. ter in die.
— iv. ad. xiv. ter in die.	
Donovan's Solution ... ..	min. x. ad. xxx. ter in die.
Ditto ... ..	min. v.
Iodide ... ..	gr. $\frac{1}{10}$ ad. gr. $\frac{1}{4}$ bis in die.
Arsenious Acid ... ..	gr. $\frac{1}{40}$ ad. gr. $\frac{1}{6}$ .
Ditto ... ..	gr. $\frac{1}{12}$ ad. gr. $\frac{1}{4}$ .

The doses of the other preparations are not specified.

3. *Nineteen* practitioners are accustomed to administer the medicine on a full stomach ; *nine* give it fasting.

4. *Twenty-one* respondents report that they have been in the habit of administering arsenic in *increasing* doses ; *thirteen*, in *uniform* doses ; and *five*, in *decreasing* doses. Of these five, however, two have given it frequently in increasing doses, and two in uniform doses. The results, therefore, of the practice herein recorded, may be looked upon as the effects of arsenical treatment, conducted on the principle of beginning with a small dose, and gradually increasing it till its effects become apparent. I have elsewhere explained that this is a most infelicitous and disadvantageous mode of administering a medicine, the effects of which are marked by a *cumulative* action on the system. My own published experience has shown that arsenic will accomplish infinitely more on the plan of reducing the dose, (commencing with a full or moderate dose,) than by the opposite method. Indeed, its maximum efficiency in chronic disease must always depend upon its prolonged and continuous use. What, then, may not arsenic accomplish, if our brethren will only be persuaded to adopt this obviously preferably plan ? Uniform doses are indeed desirable so long as no sign is shown, but no longer.

5. *Twenty-six* practitioners have administered it “alone ;” *two*, “combined ;” *three*, “with a few drops of laudanum ;” *one*, with “quinine ;” and others have given it occasionally combined with decoction of dulcamara, with common salines, with valerian, quassia, liquor potassæ, cinchona, elm bark, sarsaparilla, mercury, antimony, paregoric, bitters, and aromatics.

6. *Fifteen* have used it in private practice alone ; *two*, in hospital practice alone ; and *nine*, in both public and private practice.

#### QUESTION XI.

“What proof can you offer that the preparation you have used was pure ?”

*Eleven* correspondents reply that they have obtained it from a “respectable house ;” *four* from “Apothecaries’ Hall ;” *eight* deduce its purity from its “good effects ;” *six* “prepared it themselves ;” *one* “tested it ;” and *five* adduce no proofs at all.



## QUESTION XII.

“Have you ever used arsenic externally? In how many cases, in what diseases, and with what effect local and constitutional?”

It appears to have been used externally *with advantage* in cancer, by *four* practitioners; in fungous sores, by *two*; in lupus, by *two*; in fistulæ, white swellings, and ulcers on the toes, each by *one* practitioner: *with no advantage* in cancer by *one* gentleman. *Four* other correspondents have used it in lupus and cancer, but do not specify with what effect.

One or two speak of its effects externally used, as similar, with regard to the constitution, to its effects internally exhibited. It appears to act by absorption, and if its effects could be *regulated*, the primary effects on the stomach and bowels might be prevented by this method of administration.

Of all the respondents, only *fourteen* appear to have used it externally; and of these, *one* has found it act as a caustic, rapidly, deeply, and efficiently, without constitutional disturbance; *another* has used the deuto-ioduret, in white swellings, with much benefit; *a third* has applied it with good effect in lupus; *a fourth* has laid it on cancerous surfaces, with good local, and no constitutional effects; and *a fifth* has seen it applied to ulcers about the toes, with much service (on Bliecke and Abernethy's plan.)

## QUESTION XIII.

“Can you refer to any valuable papers or treatises on the medicinal use of arsenic, which may assist in the prosecution of this inquiry?”

In reference to the replies to this question, although, as I have already notified, I have unfortunately had neither time nor space at present to allow me to fulfil my original intention of collating and comparing the published records of arsenical treatment with the facts unfolded by this inquiry, yet I feel myself bound, not only to thank the gentlemen who have favoured me with many valuable references, but to subjoin, for the benefit of those who may wish to pursue the subject, the substance of

the replies I have received to this part of the inquiry, as well as to add a list which I had previously arranged for my own use.\*

#### QUESTION XIV.

“Can you mention any facts of interest occurring under your own eye, connected with the subject, not referred to in these questions?”

The replies to this question are numerous and interesting. They consist both of facts and opinions, which I shall present, as far as possible, in separate extracts.

FACTS.—1. *Mr. Ancell's* experience of the use of arsenic was chiefly on the Ohio and Mississippi rivers, where he administered it extensively (in many hundreds of cases of intermittent and remittent fever.) “At that time,” he adds, “quinine had not been brought into use. Powdered bark in port wine, or otherwise, was the remedy. The disease was most inveterate, the stomach would seldom tolerate a sufficient quantity of the medicine, and the disease continued five, six, or ten weeks, or longer. On suddenly setting aside the bark and taking to the white oxide of arsenic, the paroxysms were generally arrested in three days, and the patient very rapidly became convalescent.” \* \* \* “I first used Fowler’s Solution, but frequently failed; I then used the arsenious acid, beginning with one-sixteenth of a grain three times a day, increasing it to one-eighth of a grain, and in some few cases even to a sixth.”

2. *Mr. Arrowsmith* says, “In the *Medico-Chirurgical Transactions* of 1838 is a paper, by Henry Hunt, Esq., of Dartmouth, ‘On the use of Arsenic in some Affections of the Uterus.’ On reading this paper, I immediately gave arsenic an extensive trial in cases of too frequent and prolonged menstruation occurring to delicate women; and after prescribing it for ten years under such circumstances, I feel perfectly able to confirm all that Mr. Hunt has said in its praise. Mr. Hunt seemed to prefer the arsenious acid to the liquor arsenicalis, but I have given the latter preparation, being quite contented with it. I have found six or seven drops of the liquor, given every eight or twelve

\* See Appendix.



hours, act like a charm, as compared with other remedies; and this I have often persisted in for three weeks or a month, without any untoward symptom."

3. *Dr. Barham* relates the following case:—"In one case of head-ache of a curiously periodical type, most nearly approaching to double quartan, in a female, aged 24, I attributed a slight pharyngitis with failure of strength and tendency to delirium, which continued for a fortnight, to the use of moderate doses of liquor arsenicalis. As they did not recur subsequently to the discontinuance of the medicine, I see no reason to doubt the causation."

To *Dr. Barham* we are further indebted for the following account of the results of the cases which have fallen under his observation in the last ten years. They occurred at the Cornwall Infirmary, and were obligingly extracted from the hospital books by the assistant surgeon, *Mr. Gorringe*, at the request of *Dr. Barham*, both Members of the Association, and both deserving our best thanks:—

DISEASE.	No. of Males.	No. of Females.	Cured.	Failed.	Relieved.	Died.
Impetigo ... ..	2	5	5	2	...	...
Eczema ... ..	...	2	1	...	1	...
Erythema ... ..	...	1	1	...	...	...
Porrige ... ..	2	3	2	1	2	...
Prurigo ... ..	1	...	1	...	...	...
Lichen ... ..	1	...	1	...	...	...
Sycosis ... ..	1	...	1	...	...	...
Psoriasis ... ..	8	7	9	1	4	1
Lepra ... ..	2	4	4	2	...	...
Eruptio ... ..	2	2	3	...	1	...
Lupus ... ..	...	2	1	...	1	...
Carcinoma ... ..	1	1	...	...	1	1
Scrofula ... ..	1	...	...	...	1	...
Lumbago ... ..	1	1	2	...	...	...
Neuralgia ... ..	1	2	1	1	1	...
Cephalalgia ... ..	...	3	1	...	2	...
Cephalalgia (Syphilitica) ... ..	2	...	2	...	...	...
Cephalalgia (Intermittens Febrilis)	1	...	1	...	...	...
Hysteria ... ..	...	2	...	1	1	...
Chorea ... ..	...	2	2	...	...	...
Menorrhagia ... ..	...	1	1	...	...	...
Paraphlegia ... ..	...	1	...	...	1	...
Vertigo ... ..	1	...	...	...	1	...
Total ... ..	27	39	39	8	17	2

“The cases of impetigo in which arsenic failed, were cured under the use of Liq. Potass., with inunction of Ung. Picis Liq. in one case, and Ung. Cetacei in the other. The case of porrigo in which arsenic failed, recovered under the use of Tinet. Cantharides and Tinet. Ferri Sesqui-chloridi, and a lotion of Sulphas Zinci. The case of psoriasis in which arsenic failed, recovered under the use of Liq. Hydr. Bichlor. and the inunction of Ung. Hydrarg. Nitratis. Hemiplegia was the precursor of death in the fatal case. The two cases marked as failures under lepra, occurred in the same individual, who presented herself a second time at the hospital, about two years from the date of the previous discharge. In both instances, after taking arsenic without benefit, she was speedily cured by the inunction of Ung. Picis Liq. On the first occasion she took Liq. Potass. Arsenitis, in gradually increasing doses; on the second, in gradually diminishing ones. In fact, it was necessary to suspend the medicine for a short time, from gastro-æsoophageal irritation, and a small dose (two minims and a half) was afterwards borne; the eyelids were affected, but no improvement appeared in the disease. In the case of vertigo, in which arsenic failed, a cure was effected under the administration of Cupri ammonio-sulphas.”

Dr. Barham further relates a case of cancer on the lip, which appeared to be permanently cured by the external application of arsenic with calomel, on Dupuytren's plan. The brother of the patient had died from cancer, originating in the same situation. Dr. Barham says:—“The influence of arsenic diffused in the air, is, I think, deserving investigation. The works for smelting copper, from which the vapourized arsenic is most extensively given off, have been removed from this country to Wales. When such works existed here, it was asserted that an almost entire immunity from fever was enjoyed by those who lived at all near them. Cattle were stated to have become crippled, and to have lost their hoofs within the range of the same influence. I have been told that the potato blight did not affect a considerable tract over which the arsenical influence extends in the neighbourhood of Swansea. In this district, the blighting of the foliage by the poison is said to be observable two or three miles from the chimneys, in the direction of the prevailing winds. Several years ago a man was obliged to abandon mining labour,

from what was regarded as hopeless consumption; he rallied in his new employment, and has now enjoyed good health for a long period."

A friend of Dr. Barham attributes his recovery from an intermittent febrile affection, contracted in India, and slightly returning in England for ten years together, to the vapours of arsenic, diffused in his apartments from some stearine candles which he used.

*Dr. Elliotson* has combined arsenic with hydrocyanic acid and creosote, to prevent the sickness occasioned by it.

*Mr. Evan Evans* does not remember any case, either of intermittent or cutaneous disease, in which the administration of arsenic did not ultimate in cure.

*Mr. I. B. Brown* has frequently succeeded in curing Essex intermittent fevers with arsenic, after the use of bark and quinine had failed.

*Dr. Henry Cooper*, of Hull, says he has substituted arsenic for antimony, in the preparation of tartar emetic, and given one-sixteenth of a grain of the salt (tartrate of arsenic and potass,) as a dose. It is more soluble than the arsenious acid.

*Dr. Cowan* says, "Practitioners in my neighbourhood are generally averse to what they term 'strong remedies,' and there is a popular objection to the idea of arsenic particularly. *From this springs a tendency to saddle it with all conceivable consequences, and the post hoc argument is sure of its application.*" [*Query. Is Berkshire the only county in England in which the progress of science is hindered by popular objections?*]

*Dr. William Dix* writes, "During my apprenticeship in Norfolk, near the coast, the prevalence of ague was so great, that we have used in the year fifteen wine-quarts of Fowler's Solution, in a population of forty-five incorporated parishes (under Gilbert's act.) I have scarcely ever cured a case of intermittent fever, during a practice of nearly forty years, with any drug but arsenic, which I have administered with the most gratifying results."

*Mr. Bainbridge* gives the details of a case of secondary syphilis benefitted by arsenic, in a very satisfactory degree. Mr. Bainbridge was led to its adoption by the general coldness and chilliness of the surface, an indication which he and other correspondents have observed as favourable to the useful action of arsenic.



*Mr. Brown*, of Castle Donington, relates a case of lepra cured by arsenic. After a few doses had been taken, the patient complained of nausea; but this unpleasant effect was removed, by the drops being taken on the meals, instead of an empty stomach.

*Mr. Girdwood* relates that "A patient took two drachms of Fowler's Solution, in twenty-four hours, by mistake. It cured the ague, for which it was administered, (a tertian,) and it had no detrimental effect."

*Dr. Heygate* mentions the remarkable degree of success which attended the administration of arsenic during the years 1826-7-8-9, when ague was epidemic in this country. Six or seven hundred cases fell under Dr. Heygate's treatment, and he says: "The liquor arsenicalis I almost invariably found a speedy and effectual remedy. I certainly have found this solution succeed, when bark, quinine, and all other remedies have failed." It was administered always under the condition of previously correcting any foulness of the tongue which might be present; and remitted, if heat or thirst occurred during its exhibition. The dose was ten to fifteen minims.

*Mr. Hunter* says that in the fens of Lincolnshire, where arsenic is largely used, suicides are very frequent; the miasma is depressing, and the poison at hand. He also mentions, as well as Dr. Webster, De Valangin's Solution of the mineral, as having been a very popular formula half a century ago, and now again becoming fashionable. It is said to be a muriate, or hydro-chlorate of arsenic, and may be had at Apothecaries' Hall.

*Mr. Hurd* was for six years in a malarious neighbourhood, where arsenic had been long used for the cure of intermittent fever. The results varied. Where bark or quinine failed, arsenic (apparently,) succeeded, and *vice versa*; but *why*, was not at the time made out.

*Mr. Matthew Jackson* says: "The deuto-ioduret of arsenic, applied externally to splints in horses and to curbs, is a valuable application; and the arsenious acid will readily remove cankerberries from the same animal."

*Dr. Jones* says: "I believe it (the Liq. Potassæ Arsenitis,) alters its strength by keeping; inasmuch as the bottle becomes coated with an opaque film, not soluble in water, but removable

by hydrochloric acid. It cannot be owing to the Tinct. Lavand. Comp., because the bottle in which that is kept is not so coated."

Dr. Paxton refers to a case of dry asthma, much benefitted by small doses of arsenic, which, however, does not appear to have been equally efficacious in other similar cases. He also suggests an indication as to the tolerance of arsenic, which will become most valuable if it should prove, upon extensive trials, to be worthy of reliance. My own observations, which have been especially directed to the question since the receipt of Dr. Paxton's letter, have, in some degree, confirmed it. He says,—“The quantity of arsenic it is prudent or necessary to administer to different individuals in some affections, depends *on the mode of life which the patient pursues*. In sedentary persons it seems to accumulate; for a very moderate dose, say eight minims twice a day, occasions serious derangement of the animal functions,—headache, and gastric pains, &c.” Whereas those who take a great deal of active exercise, or live a laborious life, may take, without the smallest inconvenience, double or treble the dose. In proof of which he relates the case of a man who, by changing from a sedentary to an active employment, not only was able to take a double dose of arsenic, but was cured of the eruptive disease which the medicine had previously failed to remove. This fact, and the opinion founded upon the fact, and others of like nature, open a field of interesting inquiry, not only practical, as regulating the dose, but therapeutical, as tending to elucidate the *modus operandi* of this wonderful medicine. Is it to the air, or to the increased action of the capillaries, or to the relief of the nervous system, or to the augmented secretions, that we are to attribute the advantage gained?—or was it in each case accidental? All these questions can easily be brought to the test of experiment by practitioners enjoying, and bearing the responsibility of, public medical appointments.

Dr. Henry Payne appears to have prescribed arsenic with unusual success in obstinate agues, and equally obstinate cases of neuralgia. It proved a speedy cure in fifty cases, *in all of which*, other medicines had failed. The *first dose*, in many instances, removed the complaint; and in the others, this happened in the course of a few days. The Doctor gave from three to eight minims of Fowler's Solution three times daily, in cold

spring water, between the meals, with the same results in both hospital and private practice.

In whatever way these singular facts may be explained, one important lesson may be learned from Dr. Payne's experience, as compared with that of his brethren, viz: that no degree of success, or the want of it, occurring in the practice of a single individual, should be regarded as a satisfactory criterion of the medicinal action of any agent, much less of one unusually variable in its action. Had the truth of this position been duly appreciated by the profession, how much less should we now have to *unlearn*!

*Mr. Parrott* says he has used arsenic extensively for several years past, has had every reason to be satisfied with its results, and has never once had occasion to regret having employed it.

*Mr. Stoneham* says: "In a very aguish district, the poor wanted the 'drops,' not the 'doctor.'"

OPINIONS.—The following opinions expressed by different writers, must of course be regarded as of less value than well attested facts; but, considering the source from which they emanate, and the extensive experience on which they are for the most part founded, they will be regarded by the reader as too valuable to be lost.

*Dr. Golding Bird* writes: "I am glad, in your very interesting paper, that you have directed attention to the important fact of giving the arsenic *after a meal*. I have for years taught the opinion that when we wish a metal to be absorbed into the *general* circulation, it should be given mixed with the food: when only intended to enter the *portal* circulation, it should be given on an empty stomach. I have some reasons for these views. I believe the elements of the food, of a homogenic character, are absorbed by the lacteals, and not by the veins. On the other hand, the substances not forming part of the food, are (when in solution,) absorbed by the venous capillaries. Thus arsenic, or iron, in solution, and taken on a meal, so as to mix with the food, will be almost entirely absorbed into the chyle by the lacteals; but if taken on an empty stomach, the medicine will be chiefly absorbed by the venous capillaries, and enter the portal circulation. These facts are important points in practice, espe-



ially in the treatment of anæmia by iron, as they enable us to cure this condition more certainly and speedily, than without their aid."

*Dr. Mervyn Crawford* says he believes that the gastric irritation and constitutional disorder produced by arsenic (used medicinally,) have been "vastly exaggerated."

*Mr. Salter*, in a note accompanying his report, says: "I have long considered it (arsenic) one of the most valuable articles of the *Materia Medica*, and that the profession generally has evinced too much timidity in its use; and I must here add that I think you have conferred a great benefit upon your professional brethren and society, by bringing the subject of its employment prominently forward at this time."

*Mr. Stoneham*, *Mr. Sweeting*, and several other correspondents, allude to the accumulative property of arsenic, and urge the necessity of great caution in its use on this account.

*Dr. Theophilus Thompson* says: "I know nothing to compare with arsenic for efficacy, in that stage of eczema in petiginodes, when the period of free secretion (which is benefitted by mineral acids,) has passed."

I have great satisfaction in adding to this testimony, that this important distinction has been of late abundantly confirmed in my own experience. This disease is often highly inflammatory, and is only curable by arsenic, after the vessels have thoroughly discharged their contents.

*Dr. Webster* writes as follows:—

Dulwich, March 1st, 1849.

My dear Sir,—I fear you will think I have forgotten my promise of sending you the formula for the preparation of arsenic, which has been long sold at Apothecaries' Hall as "The Mineral Solvent" of De Valangin. It was first brought under my notice some eight or ten years since by Dr. Farre, as a *milder* remedy, in a case of lepra under our care, than "Fowler's Solution." Being anxious to know the exact nature of the preparation, the Doctor very obligingly procured me the formula through the kindness of Mr. T. L. Wheeler, then Chairman of the Court of Examiners at the Hall. After I had the pleasure of seeing you last week, it occurred to me that as the formula had reached me in a semi-confidential manner, (though I felt sure that the authorities at the Hall never regarded it as a secret,) I was scarcely authorized to make it publicly known without their permission. I therefore wrote to Mr. Wheeler on the subject, who at once removed any scruples I might have had on this point, by stating that the recipe for this preparation, (which, with that for the Baume de Vie

or Decoct. Aloes Comp., was imparted to the Society by De Valangin,) might have been had at all times at the Hall.

The preparation, as you will see, is in fact, a hydrochlorate of arsenic, and may now be made in a more direct manner than that prescribed by De Valangin's formula. Dr. Farre spoke highly in its praise, and considered it much *milder* in its effect than Fowler's Solution. He said,—“He had been obliged to desist from the latter in Lepra Vulgaris, and curd by the former.” Mr. Wheeler says,—“My experience is that it is far preferable to the Arsenite of Potass., inasmuch as I have found it a more direct tonic, and *altogether more manageable*; and if time and space would allow, I could dilate on this part of the subject.”

In the few cases in which I have had the opportunity of using it, it acted as efficaciously as the alkaline preparation, producing what may be called the specific effects of arsenic on the constitution and the eyes, but in a milder degree; and it certainly, *ceteris paribus*, agrees better with the stomach. One lady, whose stomach was highly sensitive to very small doses of the Liq. Pot. Ars., could bear larger doses of the Liq. Hydrochlor. Arsen. with impunity.

Some remedies agree much better with the stomach, and the system generally, when combined with mineral acids than with alkalies or vegetable acids. The hydrochlorate of morphia is a good example. One patient of mine suffered severely from all the usual preparations of opium, including Battley's Liq. Opii. Sed., and the acetate of morphia, and could detect the smallest quantity when given; yet she could bear the usual dose of the hydrochlorate of morphia with the best effects. I hope, therefore, that the hydrochlorate of arsenic will be introduced more generally into practice, and find a place in the next edition of the Pharmacopœia, which, I trust, will be a national one.

I am sorry that I cannot give you any *statistical* information respecting the use of arsenic, for I was early prejudiced against it when attending the lectures of the celebrated Professor James Gregory, of Edinburgh, who thought it could not be given for any length of time without most injuriously affecting the constitution. It is only in later years that I have employed it in neuralgia and skin diseases, and with a freedom which I at one time did not anticipate. I have cured intermittent neuralgia, or brow ague, with arsenic, when quinine has failed; and lepra, eczema, &c., when nothing else would cure; and I am happy to add, that I never saw any permanent injurious effects from its use.

Yours, very faithfully,

GEORGE WEBSTER.

To Thomas Hunt, Esq.

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[Copy of the original Formula for preparing De Valangin's Mineral Solvent.]

Take of White Arsenic, lb iij.

Common Salt, lb. viij.

Sublime in a bolt head.

Take of this Sublimate, ʒj. gr. xxxii.

Muriatic Acid, (sp. gr. 1,788) lb. ij ½.

Distilled Water, 2 gallons.

Dissolve the Sublimate in a little of the Acid and part of the Water in a Florence flask, then add the rest of the Water, and mix thoroughly.

Apothecaries' Hall, London, July, 1842.

Lastly, a gentleman, whose name I much regret I am bound to suppress, but whose experience in arsenic is, I believe, far greater than my own, speaks both of its efficiency and safety, in far stronger terms than any other correspondent. He says: "I regard it as invaluable. I would sacrifice nine-tenths of the *Materia Medica* for arsenic. This, however, I state *privately*, for the prejudice against it is very strong, and I have neither time nor inclination to become its champion." The reluctance with which this concession is made, or rather the air of secrecy with which it is communicated, proves its genuineness. This very cautious practitioner is by no means singular. I am acquainted with several who prescribe, or rather dispense, arsenic very largely for almost every form of chronic disease, but who dare not avow it, even to the profession. It has been confidently asserted that the late Mr. Scott, of Bromley, was chiefly indebted for his unparalleled success in the treatment of local disease, to his very extensive but not indiscriminate use of arsenic, which was generally disguised in sarsaparilla decoction.

#### DIGEST OF THE ABOVE REPLIES.

It will be my aim in presenting a digest of the facts contained in the above replies, so to embody them, as to render them practically useful. Here is a medicine which is potent and effective in no common degree, but yet very little used by the profession. Is it desirable that it should come into more general use? or are there circumstances which forbid it? These questions will be best replied to, by inquiring into the proofs afforded by the foregoing testimony, of its safety, its efficiency, its adaptation to disease or constitution, and various other circumstances. It will be convenient to begin with those questions, the replies to which are founded on the clearest demonstration, and afterwards to proceed to those in which the evidence is less clear, concluding with a review of those portions of the replies which are merely matters of opinion.

I. The first, and perhaps the most important point which is absolutely demonstrated in this correspondence, is that *arsenic is a safe medicine*, no correspondent having found it either fatal,



or permanently detrimental to the health. To this it may be added that in moderate doses, it seldom or never appears to have superinduced symptoms of a grave character, even for a short period. If the attack of mania, related by Mr. Fox, was in any degree the result of the administration of arsenic, which is exceedingly doubtful, it must be remembered that the patient, an hysterical (susceptible) female, took no less than twenty drops of Fowler's Solution, four times a day, or eighty drops every twenty-four hours. This dose was not prescribed by Mr. Fox, but by a physician whose name does not appear, and therefore I do not hesitate to say that if it had been *fatal*, no discredit would have rested on the medicine, but grave responsibility would doubtless have been incurred by the physician who prescribed a dose at least four or five times larger than appears to have been necessary. In the case related by Dr. Theophilus Thompson, the patient indiscreetly persevered, for more than three months, with eight-minim doses of Fowler's Solution, three times a day, *after stiffness of the eyelids and nausea had been produced*. Violent vomiting, perspirations, and coloured urine occurred in this case, doubtless the result of arsenic continued in very large doses long after the well-known premonitory symptoms of an overdose had supervened—a very instructive case, but not a case in any degree opposed to the general testimony to the safety of arsenic in moderate doses, decreased as the tarsi become affected; the case being closely watched.

It is plain, however, that the safety of the medicine must depend upon the *dose*, and this again upon its adaptation to the age and constitution of the patient; and in connexion with this important point, the question whether there is much *variableness* in the effects of arsenic in different cases, becomes very interesting. It will therefore be desirable to examine the evidence upon these two points consecutively.

1. The *dose* which has been given by the different respondents varies exceedingly. Taking Fowler's Solution for the formula, (the one used by a large majority of practitioners,) it appears that one practitioner begins with a minim of the solution thrice a day, gradually increasing to five. Another begins with ten minims thrice a day, gradually increasing to twenty; and between these extremes a great variety of doses are mentioned, the average

being about five or six-minim doses three times a day : but many mention that much larger doses are borne and required in intermittents, than in cutaneous and other chronic disorders which have not this character.

2. The *variableness of its operation* has not been noticed at all by *seventeen* correspondents. *Fourteen* have found its action variable : of these, *one* has met with "very great" variableness ; *another*, with "considerable" variableness ; a *third*, with "not much ;" a *fourth*, "but little ;" by *one* mention is made of great difference in its tolerance in different cases ; and *one* gentleman observes that, "as might be expected, females seem more susceptible of its irritating tendency than males."

Upon the whole, the evidence shows (1.) that there is greater variableness in the action of arsenic in different persons than in the action of perhaps any other mineral ; or, in other words, its influence is more liable to be modified by idiosyncrasy than that of other medicines of the same class : a fact which shows the necessity of giving the medicine in doses as small as are found to be efficient, and watching its effects carefully. And it may be noted that the same variableness of action has been observed in cases where the mineral has been used in large doses as a poison. (2.) It appears that the variable action of arsenic in different persons presents no solid objection to its general use ; inasmuch as the cases in which the system is in a great degree intolerant of the mineral, are exceedingly few ; and in these few this peculiar susceptibility may be soon discovered by administering an average dose, a few repetitions of which will reveal the truth ; and if the dose be then decreased proportionably to its effects, it will be borne with impunity, and will generally control diseased action in such cases, as readily in reduced doses as in ordinary cases in full doses. (3.) It appears that in many cases it has been administered, even in large doses, for weeks and months together, without giving any sign of its presence ; and this has happened so frequently, and in the hands of so many (at least fifteen) different observers, that it is impossible to attribute the circumstance either to the impurity of the medicine, or to any error on the part of the patient, or misapprehension on the part of the practitioner. The facts are, indeed, corroborated by the general evidence of variable susceptibility, and present

only the extreme links in the chain. The practical deductions are important. Larger doses would, doubtless, in such cases, be more efficient, but the known cumulative action of the medicine presents an objection to the practice of increasing the dose, and rather justifies a long-continued perseverance in moderate doses. I have myself observed that the permanent power of the medicine, in preventing relapses of cutaneous disease, is more conspicuous in cases where it has acted thus slowly, than when the system has suddenly yielded to its influence.

II. With regard to the *efficiency of arsenic in various diseases*: although two or three of our respondents have been generally disappointed in their expectations, and one attributes his success to *time*; nevertheless, the replies present overwhelming evidence of its utility; and in many cases the evidence is absolutely demonstrative, the disease having recurred on the abandonment of the medicine, and regularly yielded to every successive course.\* The synopsis (page 393,) will show at a glance the diseases in which its efficacy has been most observable. It appears, from this table, that arsenic has been chiefly prescribed in cutaneous and intermittent diseases and in neuralgia, and that it has been by far more frequently used in the *various chronic forms of non-contagious skin disease* than in any other disorder. The success attending its use in these affections has been various, but quite sufficiently demonstrative and extensive to signalize the mineral as *the* medicine for cutaneous disease. In *intermittents* its effects are more uniform, and in neuralgia scarcely less so. Indeed it appears that in *intermittent neuralgia* it seldom or never fails;—that in ague, of whatsoever type, quinine will rarely fail alone, and arsenic alone will rarely fail; but when one fails, the other will often succeed:—and a combination of *both* remedies in full doses will never fail in intermittents. This opinion is confirmed by the observations of several correspondents.

Of the other diseases enumerated in the foregoing table, how many, alas, have eluded all our efforts! Is it too much to add,

\* Mr. Andrews says he has generally attributed the cure in eruptive diseases to *time*, although he has been continuing the arsenic. Mr. Cassels, on the other hand, says, "In several cases of lepra the disease has been apparently cured, but returned after many months, when the arsenic has again been given *with the same result*."



that in no one of these affections should the case be abandoned, without a fair trial of arsenic? This question naturally introduces another important inquiry, viz. :—

III. What are the peculiar circumstances, in any given case, which would justify the administration of arsenic; and what are those which should be taken to interdict its use?

This is a most important practical inquiry; but although it is my duty to present the evidence, I confess that it is not entirely demonstrative, the line of demarcation which separates facts from opinions being by no means distinct. I could wish, indeed, that this difficult digest were in abler hands. I do think, however, that by faithfully analysing both facts and opinions, the following conclusions would appear to the general professional mind, quite as satisfactory as the grounds on which we are usually accustomed to act in practice.

(1.) The most zealous advocate for the use of arsenic will scarcely refuse to subscribe to the following postulate, viz. :—Let it be granted that arsenic, being a dangerous and deadly poison, and, moreover, exceedingly variable and uncertain in the energy of its action on different individuals, *should never be administered in any case in which other medicines, less objectionable, are likely to prove equally efficacious.* To this rule I invariably adhere in my own practice. Still it must be admitted that the rules of medical practice are not absolute, and we may readily conceive of exceptions to this. Quinine, when pure and exhibited in sufficiently large doses, is perhaps as certain a remedy for intermittents as arsenic; but in marshy and malarious districts it is evident that thousands of the poorer classes afflicted with ague must remain uncured, unless a cheaper remedy than quinine can be found: and seeing that, under proper restrictions, arsenic is a safe and generally an efficient remedy, who shall be found to censure its adoption? The Union Surgeon must be much better paid than he now is, before any one can blame him for using the cheaper drug. And in the case of children, with whom arsenic generally agrees very well, and who can scarcely be induced to take nauseous drugs in sufficient quantities, it may be very justifiable to substitute arsenic for quinine.

(2.) *A passive condition of the circulation is favourable to the*

*exhibition of arsenic*, and, *vice versa*, whenever there is an abnormal degree of power in the pulse, its use is contra-indicated, more especially if there be a hot skin and suppressed secretions, or an irritable condition of the mucous membranes. The following different descriptions of the condition of system, in which its action has been found favourable, will confirm the above remark. I quote the expressions (as concisely as possible) in which various correspondents have conveyed this idea :—"In the phlegmatic, rather than the sanguine temperament;" "In cachectic, lax-fibred habits;" "In debility;" "In the atonic state of the system;" "In general pallor;" "Slow circulation;" "General coldness;" "Non-inflammatory condition;" "Freedom from febrile, or mucous irritation." I commend these valuable hints to the consideration of the practitioner. I have generally found, however, that arsenic is well borne, even in plethoric habits, if the pulse be first of all reduced to a soft compressible condition, by evacuants and a spare, non-stimulating diet. In opposition to this, several correspondents aver that a "tonic condition," "the sanguine temperament," "a plethoric habit," and a "proneness to irritability of the circulative and assimilative systems," are circumstances which, in their experience, severally contra-indicate its use. Other respondents add, "where the lungs are unsound," where there is observable "natural irritability of the mucous membranes," "an inflammatory tendency," "acute disease," "head symptoms," "eczema mercuriale," "organic disease," or "tendency to sudden nervous exhaustion." Here again are suggestions, rich in instruction, and full of practical interest.

IV. Assuming that arsenical treatment is indicated in a given case, what are the signs of an overdose?

The signs enumerated may be divided into two classes, viz.: the vascular and the nervous. The vascular signs, or those which betray an increased momentum in the circulation, are as follows :—"Conjunctivitis," "swelling of the limbs or features," "irritation of mucous membrane," "purging," "gastritis," "desquamation of cuticle," "general inflammatory state," and "flushings." The nervous signs, or those which betray disordered sensation or excitement of the nervous system, are described as "headache," "exhaustion," "restless nights," "sinking," "giddiness," "palpi-

tations," and "mental agitation and alarm." The order in which these symptoms appear, and the influence they should exercise in practice, are variously stated. "Conjunctivitis" is certainly named most frequently as the sign of an over-dose, although one gentleman has never observed it. In fact, it is frequently so slight as to elude observation; but its importance consists in this circumstance, that it is not so likely as the other signs to be otherwise caused. The other mucous membranes are so frequently excited by cold and other causes, that it is often impossible to determine their origin; whereas the arsenical conjunctivitis is a special affection, less violent by far than the strumous inflammation of the tunie, and marked by itching of the tarsi, increased secretion, puffiness of the lower eyelid, and if this be everted, the membrane presents a horizontal red streak, perfectly characteristic; as much so, indeed, as the mercurial affection of the gums. The various affections of the nervous system, considered as signs of an over-dose, are equally vague as those of the circulation. They are often produced by the *idea* of being poisoned. I have myself found it both safe and useful to regard them but little, until their origin becomes demonstrated by the peculiar red streak on the portion of the conjunctiva lining the lower eyelid. Two or three other symptoms, not easily elassed, are mentioned, viz: "tympanitis," "emaciation," and "sickness." They appear to be rare.

V. What is to be done when the signs of an over-dose are manifest?

Almost every correspondent thinks it best to discontinue the medicine; some for a period, others altogether. Here, I may be allowed to suggest, is a wide field for improvement. It is rarely necessary to break off the course, much less to abandon the use of the medicine; but the dose should be gradually reduced, and the curative action will be safely sustained. The truth of this I have now proved in several hundreds of cases. The value of arsenic will never be fully known until this practice is universally adopted.

VI. How far are the effects modified by the mode of administration in respect to the meals?



I cannot say that the reports are so satisfactory on this point as I had been led to expect. I have generally found that if the medicine is given *fasting*, gastric symptoms are among the earliest intimations of an over-dose; but when mixed with the food, or taken immediately after a meal, it seldom offends the stomach. Out of twenty-nine gentlemen who have given it fasting, fifteen report the appearance of gastric symptoms. Of nineteen practitioners who have exhibited the mineral on a full stomach, ten have observed gastric symptoms; the proportions, therefore, are nearly equal.

VII. With respect to the purity of the preparation in general use, I was once induced to suspect, from the apparent variableness resulting from its exhibition, that the *liquor potassæ arsenitis* was frequently adulterated. Farther inquiries, aided by the reports in my hands, have modified this opinion as to the present condition of the solution sold by druggists. The progress of science has prevented the mistakes formerly of common occurrence; and, with the exception that it is sometimes met with *stale*, the compound spirit of lavender having lost its fresh odour, I believe it is pure, usually containing the proper proportion of arsenic. The variableness of its action appears to depend on idiosyncrasy. The cause is found in the patient, not in the drug; and this opinion is confirmed by the fact, that although the evidence of its purity varies in different reports, *there is no corresponding discrepancy in the description of its effects.*

The reader is now in possession of the best abstract view of the reports which my ingenuity can furnish, and will form his own opinion of their value, and of the use to be derived from them. My own experience of arsenic is *not* included in this memoir, but I may be permitted to add, that since I first published my views of its efficacy in chronic cutaneous diseases, my attention has been directed to its use, uncombined and systematically administered in certain *other* diseases which have hitherto been regarded by common consent as absolutely incurable, such as cancerous and fungoid affections. Knowing how extremely fallacious mere individual experience always must be, I am positively afraid to make known, at present, the degree of success which



has hitherto attended these experiments, as it may have been, and probably is, fortuitous; but there is an interesting field of inquiry open to the Members of the Association in this department. Let such a disease as cancer, or any adventitious growth in its earlier stages, be treated with arsenic internally, on the conditions of administration which this memoir demonstrates as most favourable for its action. Let the treatment be persisted in, nothing forbidding, for three months. Let the case be then left to nature for three months, and the arsenic resumed for a like period, and again let its use be remitted, watching the case closely, and avoiding, as far as possible, all disturbing influences. Each case *must* tell an instructive tale. Let the details be noted in a case-book, always in the presence of the patient, lest the memory prove treacherous. *Let every Member of the Association, and every professional reader,* be persuaded to pursue this plan for twelve months, having the notes ready for delivery whenever the Association shall ask for them, and in less than two years from this time the profession will have gained a valuable increment of practical knowledge, whilst the patients so treated, I will undertake to say, will have no cause to complain that they have been tampered with, or that they would have fared better under the routine practice of the day.

In conclusion, I have to express my sincere regret that my laborious, but grateful task has been so imperfectly executed, and to apologise to my brethren for any inadvertent errors or omissions which the heterogeneous mass of valuable matter in my hands has probably rendered inevitable. The original letters will be carefully preserved and deposited wherever the Association shall see fit to direct, in order that any want of accuracy may be corrected, and that any member may be able to ascertain how much he, as well as the humble compiler, is indebted to his brethren for their valuable contributions to the bewildering science of therapeutics.



## A P P E N D I X.

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“Medico-Chirurgical Transactions,” vol. xxi; 1838. “On the use of Arsenic in some Affections of the Uterus.” By Henry Hunt, Esq., of Dartmouth.

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*Ibid*, vol. x, Paper by Mr. Salter, of Poole.

Hunt, “On Diseases of the Skin.” (1847.)

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Rayer’s “*Traité des Maladies de la peau.*”

Dr. Heygate, “On Tic Douloureux, or Neuralgia.” (Edinburgh, 1836.)

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Dr. Jaeger’s “*Dissertatio inaug. de effectibus Arsenici in varios organismos,*” &c.

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